

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International publication date
29 September 2005 (29.09.2005)

PCT

(10) International publication number
WO 2005/090617 A1

(51) International patent classification⁷:
B21K 1/08, B23P 9/04, B24B 39/04

C21D 7/04,

(72) Inventors; and

(75) Inventors/Applicants (US only): REEB, Alfons [DE/DE]; Scheurenfeldstr. 8, 73434 Aalen (DE). SCHMIDT, Jochen [DE/DE]; Sperberweg 9, 73529 Schwäbisch Gmünd (DE). BÖMCKE, Alexis [DE/DE]; Vogtlandstr. 7, 73431 Aalen (DE).

(21) International application number: PCT/EP2005/001190

(22) International filing date: 5 February 2005 (05.02.2005)

(25) Language of filing: German

(74) Attorney: LORENZ, Werner; Alte Ulmer Strasse 2, 89522 Heidenheim (DE).

(26) Language of publication: German

(30) Data relating to the priority:
10 2004 008 728.8 23 February 2004 (23.02.2004) DE

(81) Designated states (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX,

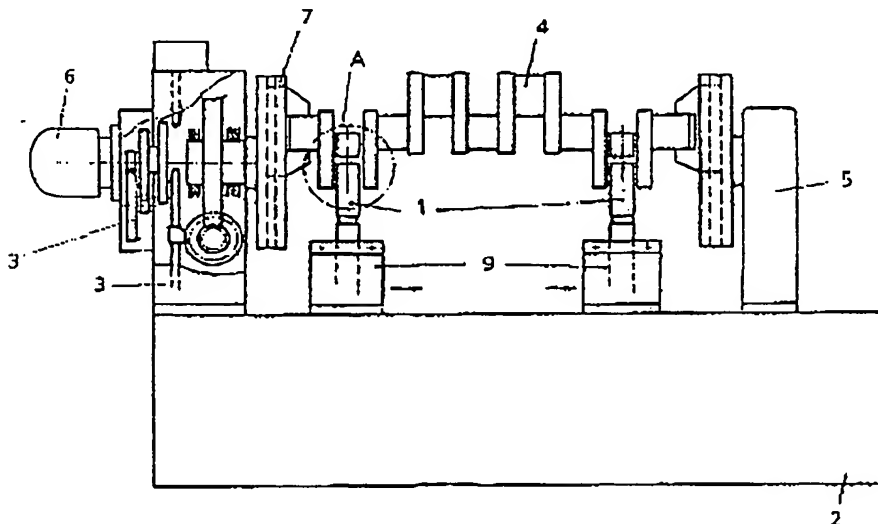
(71) Applicant (for all designated States except US):
MASCHINENFABRIK ALFING KESSLER GMBH [DE/DE]; Auguste-Kessler-Strasse 20, 73433 Aalen (DE).

[continued on next page]

As printed

(54) Title: METHOD AND DEVICE FOR INCREASING THE ENDURANCE LIMIT, IN PARTICULAR THE BENDING STRENGTH AND TORSIONAL STRENGTH OF CRANKSHAFTS

(54) Bezeichnung: VERFAHREN UND VORRICHTUNG ZUR STEIGERUNG DER DAUERSCHWINGFESTIGKEIT, INSBESONDERE DER BIEGEWECHSELFESTIGKEIT UND DER TORSIONSWECHSELFESTIGKEIT VON KURBELWELLEN



(57) Abstract: The invention relates to a method for increasing the bending strength and the endurance limit of crankshafts by locally restricted hammering in areas of high stress, such as grooves, the mouths of bores and cross-sectional transition zones, in which method pressure impulse machines or beating devices comprising beating tools are employed. The pressure impulse machines or beating devices only execute a relative displacement of the beating tool against the surface of the crankshaft segment to be processed when the compressive stress is introduced between the beating tool and said surface of the crankshaft segment to be processed. The invention also relates to a device for increasing the endurance limit of crankshafts.

[continued on next page]

WO 2005/090617 A1

EV832835017

WO 2005/090617 A1

MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

- (84) Designated states (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

- as to inventor's identity (Rule 4.17 paragraph i) for all designated states
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17 paragraph ii) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN,

MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

- as to applicant's entitlement to claim the priority of the earlier application (Rule 4.17 paragraph iii) for all designated states
- of inventorship (Rule 4.17 paragraph iv) for the following designation US

Published:

- With International Search Report

For an explanation of the two-letter codes and the other abbreviations, reference is made to the explanations ("Guidance Notes on Codes and Abbreviations") at the beginning of each regular edition of the PCT Gazette.

(57) Zusammenfassung: Bei einem Verfahren zur Steigerung der Biegeweichselfestigkeit und der Dauerschwingfestigkeit von Kurbelwellen durch örtlich begrenztes Hämmern in hoch beanspruchten Bereichen, wie Hohlkehlen, Bohrungsmündungen und Querschnittsübergängen, sind Druckimpulsmaschinen oder Schlagvorrichtungen mit Schlagwerkzeugen vorgesehen. Die Druckimpulsvorrichtungen oder Schlagmaschinen führen zum Zeitpunkt der Druckspannungseinbringung zwischen dem Schlagwerkzeug und dem zu bearbeitenden Kurbelwellensegment nur eine Relativbewegung entgegengesetzt der Oberfläche des zu bearbeitenden Kurbelwellensegmentes aus. Die Erfindung betrifft auch eine Vorrichtung zur Steigerung der Dauerschwingfestigkeit von Kurbelwellen.